iWave
Embedding Intelligence

i.MX6 Pico ITX Single Board Computer

iW-RainboW-G15S
Quick Start Guide

R3.0

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INTRODUCTION

About this Guide

This document is intended as the guide for unpacking iWave's iW-RainboW-G15S - i.MX6 Pico ITX Single Board Computer (SBC) package and setting up the test environment for it. It also gives details about safety information and important cautions which should adhere while using the SBC.

SBC Overview

The iW-RainboW-G15S i.MX6 Pico ITX SBC which is based on Freescale's i.MX6 Series application processor. This integrates all standard interfaces into a single board with ultra-compact yet highly integrated system that can be utilized across multiple embedded PC and industrial designs.

Important Symbols Used

Important Note

Warning

Use ESD Protection

ROHS complaint

Check the local regulations for disposal of electronic products

UNPACKING

Safety Information

- Before unpacking and installing the SBC or adding devices on it, carefully read all the manuals that came with the package.
- Place the product on a stable surface. To avoid short circuits in electronics, keep all conducting material away from the SBC.
- Avoid using board in extreme dust, humidity and temperature conditions. Do not place the SBC in wet area.
- Before using the SBC, make sure that all cables are correctly connected and the power adopter is correctly selected.
- Make sure that Electrical Outlet where you connected the power adapter is not damaged and working fine.
- If the power adapter is broken, do not try to fix it by yourself. To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before displacing the system.

Check the local regulations for disposal of electronic products.

Unpacking Guidelines

Please follow the below guidelines while unpacking the iW-RainboW-G15S SBC.

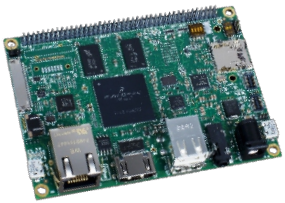
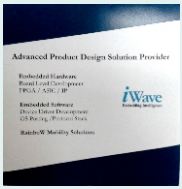
- Make sure to follow the below antistatic guidelines before unpacking.
  - Wear the anti-static wristband while unpacking and handling the SBC to prevent electrostatic discharge.
  - Use anti-static pad/mat with proper grounding to place the SBC.
  - Don't touch the inside surface of the SBC circuit board.
  - Self-grounding: Touch a grounded conductor every few minutes to discharge any excess static build-up.

- Make sure that packing box is facing upwards while opening.
- Make sure that the entire packing list items mentioned in Package Checklist present.

Static electricity can destroy electronics in the SBC. Make sure to follow the ESD precautions to prevent damage to the system and injury to the user.

Package Checklist

The iW-RainboW-G15S Pico ITX SBC will be shipped with the following items:

Sl. No.	Package Item	Qty	Image
1	iW-RainboW-G15S i.MX6 Pico ITX SBC	1	 RoHS All components used in this system is Lead free and ROHS complaint
2	5V,2.5A Power Adaptor with universal plugs	1	
3	Quick Start Guide Hard copy	1	
4	DVD (Please refer DVD Content section)	1	

Do not proceed with installation, if any of the items listed in the above checklist is missing or damaged. Contact iWave support team.

SETTING UP THE TEST ENVIRONMENT

Getting Start

This section describes the step by step procedure to setup the test environment for iW-RainboW-G15S SBC.

- Read the SBC Documents
- Check Boot Mode setting
- Setting up the Debug port
- Power ON the SBC

Read the Documents

Before setting up the test environment, one must read all the documents of the iW-RainboW-G15S SBC to know about the system, its features and to get familiar with it. These documents are available in the DVD which comes along with the iW-RainboW-G15S Package.

Below mentioned documents are available in the DVD,

- iW-RainboW-G15S Quick Start Guide (This Guide)
- i.MX6 Pico ITX SBC Hardware User Guide
- Software User Manual
- Release Notes for Software

Refer DVD contents section to know about the DVD content structure and system related document's path.

Boot Mode Setting

iW-Rainbow-G15S SBC supports different boot mode options for booting.

- Internal Boot Mode (Default):
  This mode is used for normal booting and default set while shipping. Please make sure that boot mode switch (SW4) is in this mode while setting up the Test Environment.

- Serial Downloader Mode:
  This mode is used when user wants to program boot media using MFG Tool. For more details, please refer Software User Manual.

Boot modes can be selected by user using boot mode switch (SW4) settings on i.MX6 SBC as mentioned below . For more details, refer i.MX6 Pico ITX SBC Hardware User Guide.

Boot Mode Settings Truth Table

Boot Mode Setting On i.MX6 SBC	SW4 (2 Position Switch)		
	POS1	POS2	Image
Internal Boot Mode (Default)	OFF	ON	
Serial Downloader Mode	ON	OFF	
ON - High OFF - Low			

Use ESD Protection while changing the switch setting.

Debug Port Setting

iW-RainboW-G15S SBC supports Micro USB Connector as Debug port for Debugging and Testing. Please follow the below procedure to setup the Debug port of SBC.

- Use USB MicroAB to Type A cable to connect between SBC and PC for debugging. Connect TypeA end of USB cable to PC and Micro AB end of USB cable to SBC's debug Micro USB connector(J8) as shown below.

Debug Port Connection

- Install the driver for Debug USB Port in Host PC/Laptop using the below link.

  Drivers located at: http://www.ftdichip.com/Products/ICs/FT232R.htm

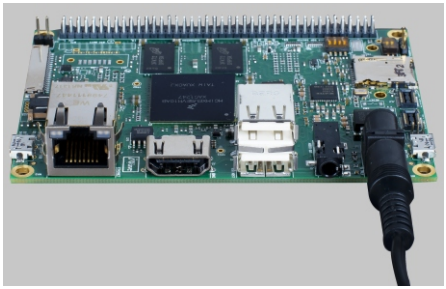
- Open the HyperTerminal on PC/Laptop with the following setting.

Baud rate	: 115200 bps
Data bits	: 8
Parity	: None
Stop bits	: 1
Flow control	: None

Powering ON iW-RainboW-G15S

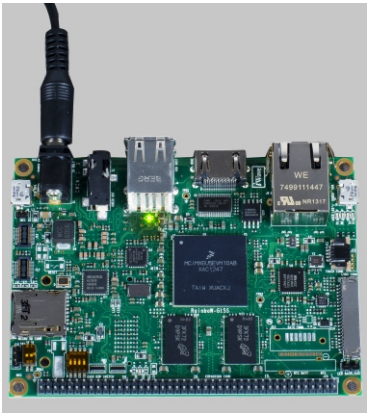
iW-RainboW-G15S platform comes with 5V, 2.5A power supply with universal plugs. Please follow the below procedure to power ON the SBC.

- Connect the 5V power supply plug to the power connector (J3) of the iW-RainboW-G15S SBC as shown below and switch ON the power supply.



Power Supply Connection

- Once Power is applied to iW-RainboW-G15S SBC, the Power LED in the i.MX6 SBC module will glow as shown below.



Power ON Indication

Do not proceed with installation, if the Power Status LED is blinking or not glowing. Contact iWave support team.

Done with Test Environment

Once power is applied to iW-RainboW-G15S SBC as explained in the previous section, the HyperTerminal of the PC/Laptop which is connected to the SBC will immediately show the boot messages of the boot loader.

iWave supports below mentioned Operating System Releases for iW-RainboW-G15S SBC.

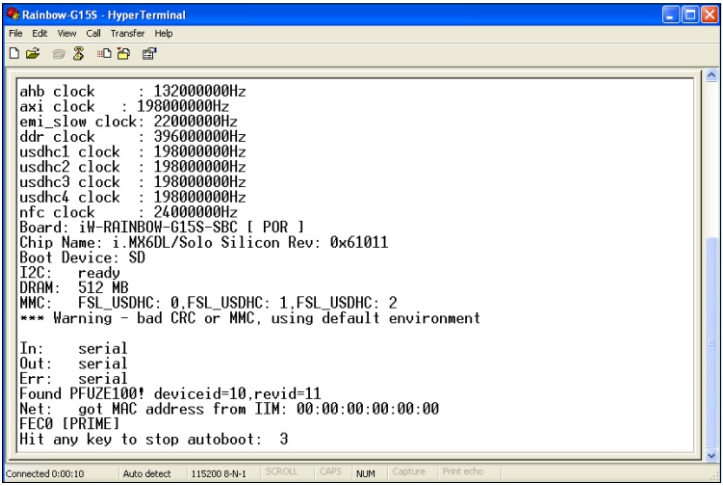
- Linux 3.0.35 (or higher)
- Android 4.0.4 (or higher)
- Windows Embedded Compact 7

Depending upon the supported Operating system and boot loader on particular delivery, the Hyper Terminal will show the boot messages as described in the following section.

1. **SBC comes with bootable binary in default boot media.**
2. **Make sure that all the steps mentioned in Getting Start section is followed.**

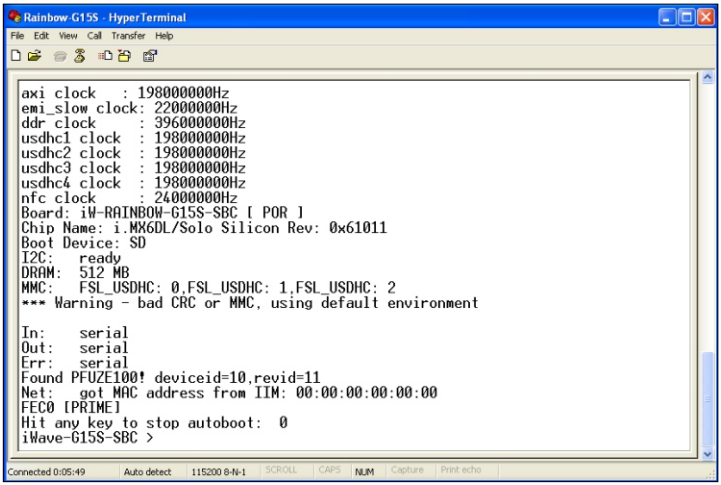
Linux Test Environment

- In Linux Release, U-boot boot messages will appear in Hyper Terminal as shown below.



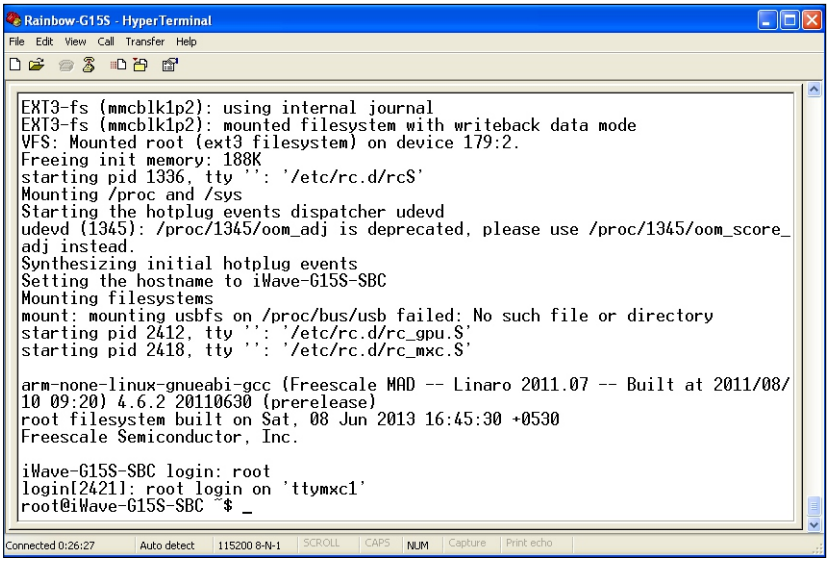
U-boot on Terminal

- Immediately after power on, Press any key in HyperTerminal to go to the U-boot command prompt as shown below. Otherwise Linux will launch automatically.



U-boot Command Prompt

- Once Linux is launched, Linux login prompt will come in Hyper terminal and enter "root" in Hyper terminal to get the Linux command prompt as shown below. Once you get the prompt you are done with Test Environment setup on Linux delivery.

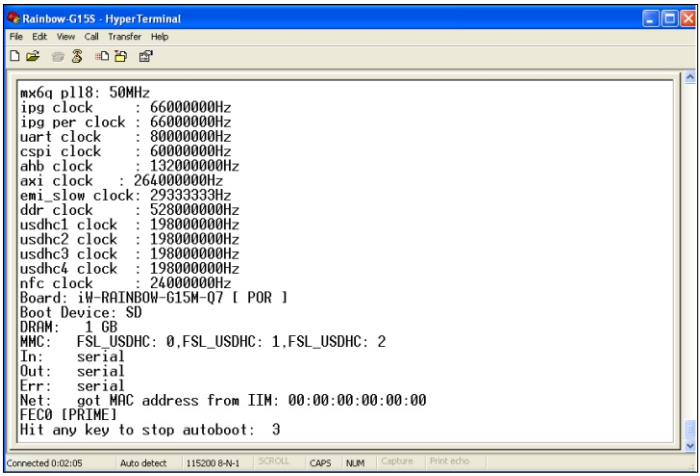

Rainbow-G15S - HyperTerminal
File Edit View Call Transfer Help
EXT3-fs (mmcblk1p2): using internal journal
EXT3-fs (mmcblk1p2): mounted filesystem with writeback data mode
VFS: Mounted root (ext3 filesystem) on device 179:2.
Freeing init memory: 188K
starting pid 1336, tty '': '/etc/rc.d/rcS'
Mounting /proc and /sys
Starting the hotplug events dispatcher udevd
udevd (1345): /proc/1345/oom_adj is deprecated, please use /proc/1345/oom_score_adj instead.
Synthesizing initial hotplug events
Setting the hostname to iWave-G15S-SBC
Mounting filesystems
mount: mounting usbfs on /proc/bus/usb failed: No such file or directory
starting pid 2412, tty '': '/etc/rc.d/rc_gpu.S'
starting pid 2418, tty '': '/etc/rc.d/rc_mxc.S'
arm-none-linux-gnueabi-gcc (Freescale MAD -- Linaro 2011.07 -- Built at 2011/08/10 09:20) 4.6.2 20110630 (prerelease)
root filesystem built on Sat, 08 Jun 2013 16:45:30 +0530
Freescale Semiconductor, Inc.
iWave-G15S-SBC login: root
login[2421]: root login on 'ttymxc1'
root@iWave-G15S-SBC ~$ _
Connected 0:26:27
Auto detect
115200 8-N-1
SCROLL
CAPS
NUM
Capture
Print echo

Linux Command Prompt

Refer Linux Software User Manual for further details.

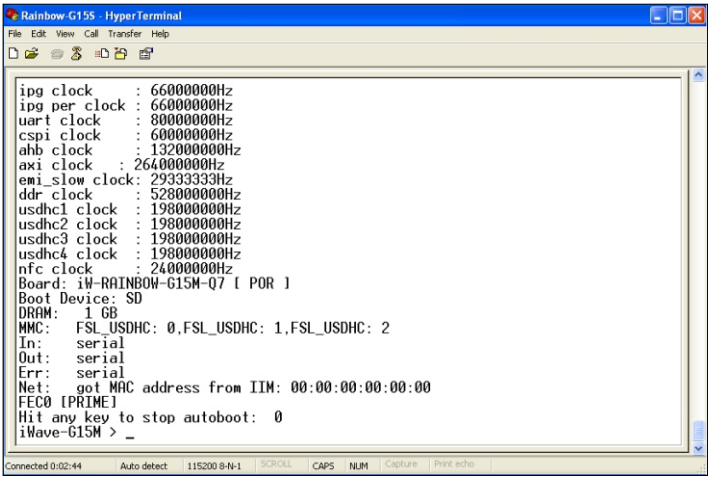
Android Test Environment

- In Andriod Release, U-boot boot messages will appear in Hyper Terminal as shown below.



U-boot on Terminal

- Immediately after power on, Press any key in Hyper Terminal to go to the U-boot command prompt as shown below. Otherwise Android will launch automatically.

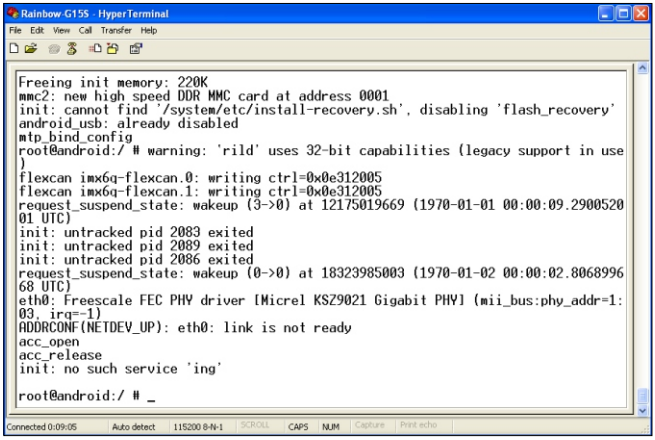


U-boot Command Prompt

- Once Android is launched, if the HDMI display is connected to SBC, Android screen will appear as shown below and Hyper Terminal will show the Android command prompt.

HDMI display after Android Launch

- Press Enter key in terminal to see the Android command prompt as shown below. Once you get the prompt you are done with Test Environment setup on Android delivery.

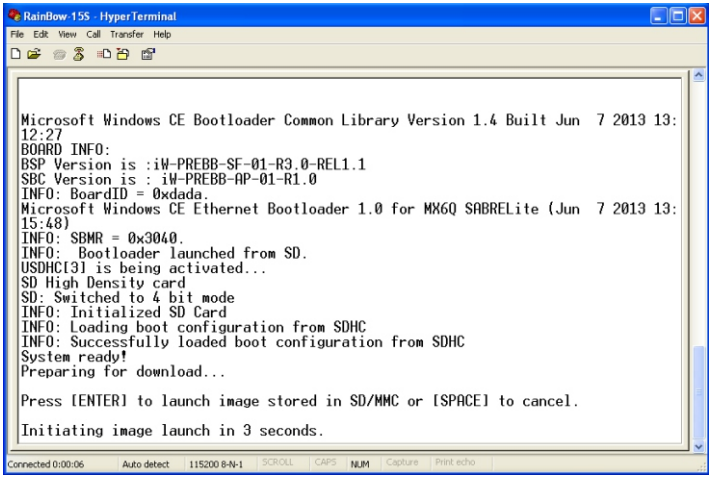


Android Command Prompt

Refer Android Software User Manual for further details.

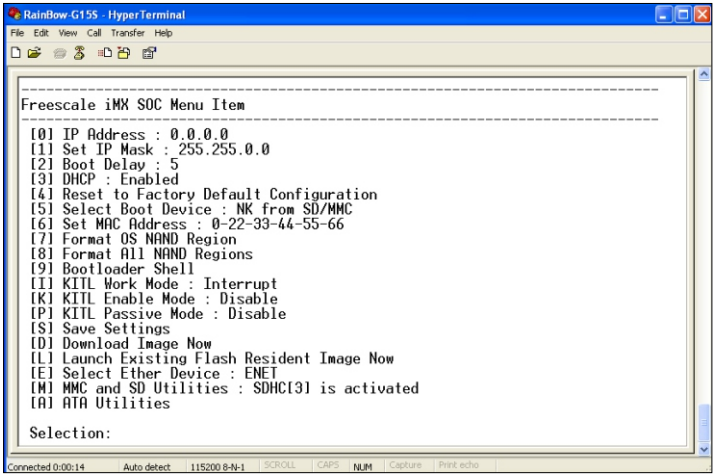
WEC7 Test Environment

- In WEC7 Release, E-boot boot messages will appear in HyperTerminal as shown below.


RainBow-15S - HyperTerminal
File Edit View Call Transfer Help
Microsoft Windows CE Bootloader Common Library Version 1.4 Built Jun 7 2013 13:12:27
BOARD INFO:
BSP Version is :iW-PREBB-SF-01-R3.0-REL1.1
SBC Version is : iW-PREBB-AP-01-R1.0
INFO: BoardID = 0xdada.
Microsoft Windows CE Ethernet Bootloader 1.0 for MX6Q SABRELite (Jun 7 2013 13:15:48)
INFO: SBMR = 0x3040.
INFO: Bootloader launched from SD.
USDHC[3] is being activated...
SD High Density card
SD: Switched to 4 bit mode
INFO: Initialized SD Card
INFO: Loading boot configuration from SDHC
INFO: Successfully loaded boot configuration from SDHC
System ready!
Preparing for download...
Press [ENTER] to launch image stored in SD/MMC or [SPACE] to cancel.
Initiating image launch in 3 seconds.
Connected 0:00:06
Auto detect
115200 8-N-1
SCROLL
CAPS
NUM
Capture
Print echo

E-Boot on HyperTerminal

- Immediately after power on, Press Space key in Hyper Terminal to go to the E-boot command prompt as shown below. Otherwise WEC7 will launch automatically.


RainBow-G15S - HyperTerminal
File Edit View Call Transfer Help
Freescale iMX SOC Menu Item
[0] IP Address : 0.0.0.0
[1] Set IP Mask : 255.255.0.0
[2] Boot Delay : 5
[3] DHCP : Enabled
[4] Reset to Factory Default Configuration
[5] Select Boot Device : NK from SD/MMC
[6] Set MAC Address : 0-22-33-44-55-66
[7] Format OS NAND Region
[8] Format All NAND Regions
[9] Bootloader Shell
[I] KITL Work Mode : Interrupt
[K] KITL Enable Mode : Disable
[P] KITL Passive Mode : Disable
[S] Save Settings
[D] Download Image Now
[L] Launch Existing Flash Resident Image Now
[E] Select Ether Device : ENET
[M] MMC and SD Utilities : SDHC[3] is activated
[A] ATA Utilities
Selection:
Connected 0:00:14
Auto detect
115200 8-N-1
SCROLL
CAPS
NUM
Capture
Print echo

E-Boot Command Prompt

- Once WEC7 is launched, if the HDMI display is connected to SBC, WEC7 screen will appear as shown below. Once you get the WEC7 screen, you are done with Test Environment setup on WEC7 delivery.

HDMI display after WEC7 Launch

Refer WEC7 Software User Manual for further details.

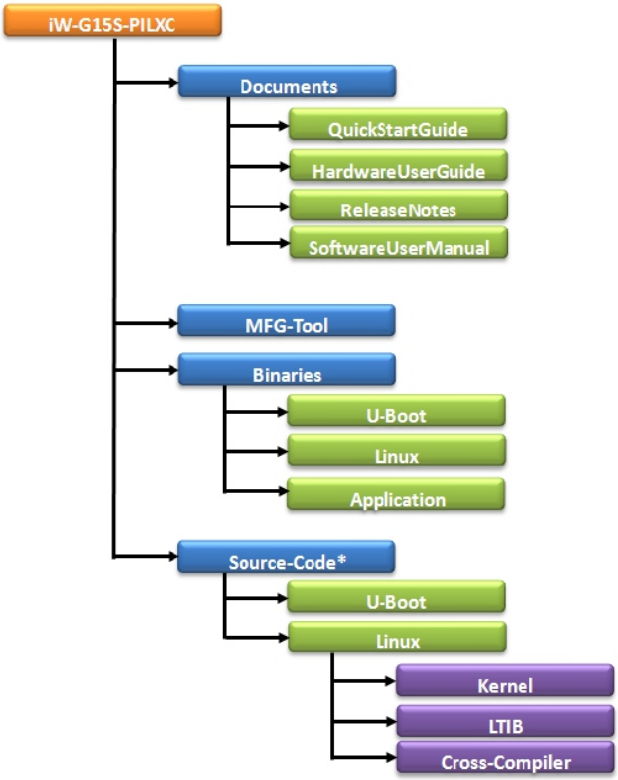
DVD Contents

iWave supports below mentioned Operating System Releases for iW-RainboW-G15S SBC

- iW-G15S-PILXC - Linux 3.0.35 or higher
- iW-G15S-PILAC - Android 4.0.4 or higher
- iW-G15S-PIWCC - Windows Embedded Compact 7

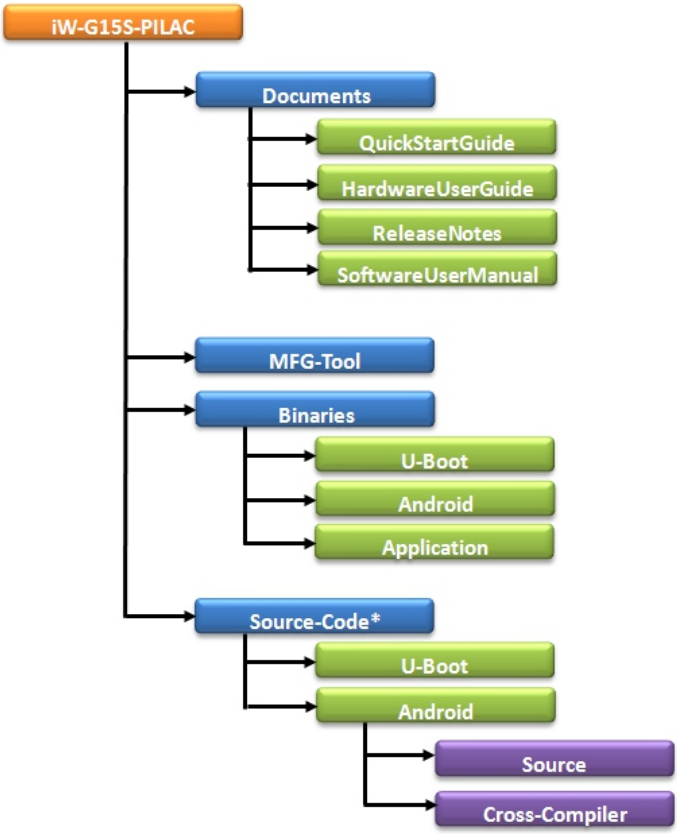
DVD contents will differ depending upon the operating system supported on the particular delivery. The following Figures show the DVD content structure of each Operating System Release.

Linux Release DVD Contents



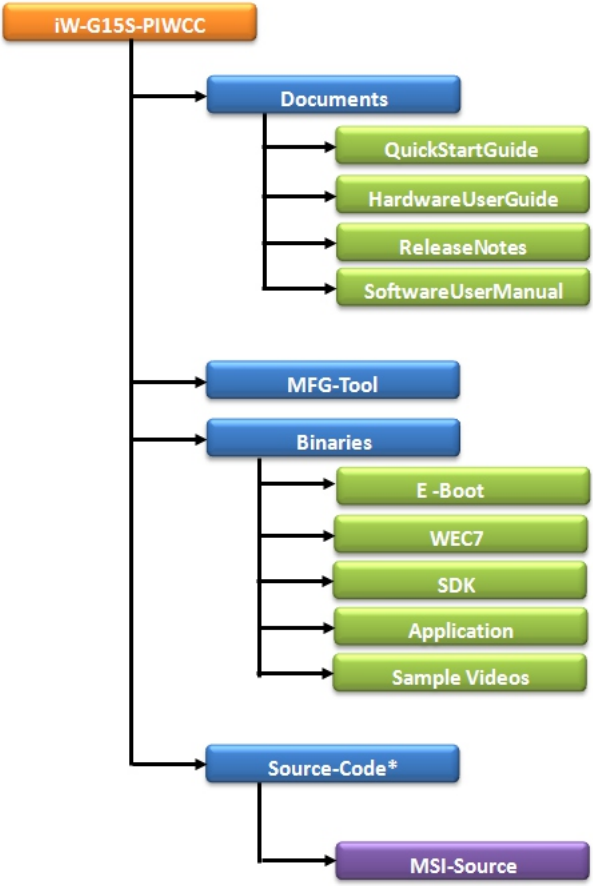
*Only Applicable for BSP source delivery

Android Release DVD Contents



*Only Applicable for BSP source delivery

WCE7 Release DVD Contents



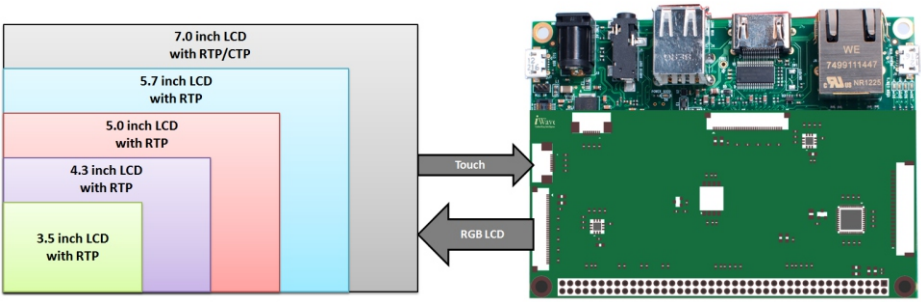
*Only Applicable for BSP source delivery

Note

iWave continuously improves software releases with latest kernel version. Contact iWave for latest software release detail.

Unified LCD Add On Module for RainboW-G15S

- iWave supports unified LCD add-on module for RainboW-G15S SBC which can be used to connect different size of LCD panels from 3.5 inch to 7.0 inch.



*For more details about Unified LCD add on module, contact iWave Sales Team.

Compatible LCD Panels

Sl. No.	Part No.	Manufacturer	Description
1	ET035080DH6	EDT Corp.	3.5 inch with RTP
2	ET035080DM6	EDT Corp.	3.5 inch without TP
3	ET043080DH6	EDT Corp.	4.3 inch with RTP
4	ET043080DM6	EDT Corp.	4.3 inch without TP
5	ET050080DH6	EDT Corp.	5.0 inch with RTP
6	ET050080DM6	EDT Corp.	5.0 inch without TP
7	ET057080DH6	EDT Corp.	5.7 inch with RTP
8	ET057080DM6	EDT Corp.	5.7 inch without TP
9	ET070080DH6	EDT Corp.	7.0 inch with RTP
10	ET070080DM6	EDT Corp.	7.0 inch without TP
11	ETM070080ADH6	EDT Corp.	7.0 inch with CTP

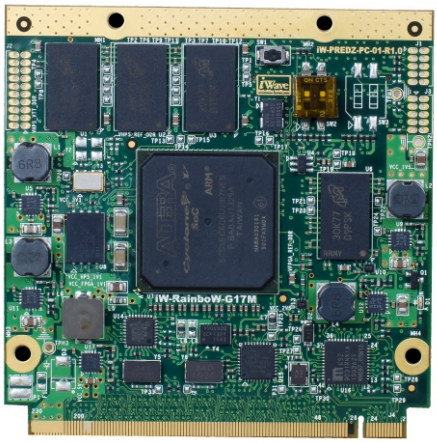
Acronyms:

TP - Touch Panel
RTP - Resistive Touch Panel
CTP - Capacitive Touch Panel

iWave's New SOM Products

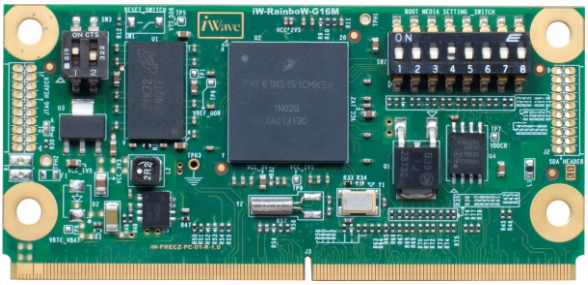
iW-RainboW-G17M-Cyclone V SoC Q7 SOM

iWave Systems launching Altera's Cyclone V SX SoC based Qseven compatible CPU module for the increased system performance requirements. The Dual ARM Cortex A9 core with the FPGA allows greater flexibility for the system designers and helps to lower the system cost and power consumption.



iW-RainboW-G16M-Vybrid µMXM SOM

The RainboW-G16M-µMXM SOM is based on Freescale's Vybrid VF6xx/VF5xx family solution combining ARM Cortex-A5 and Cortex-M4 cores, which often eliminates the need for an external MCU for real time control applications. The µMXM SOM is a compact module packed with 256MB on board RAM & 256MB NAND Flash. The module brings all the Vybrid peripheral interfaces to a 314-pin MXM edge connector.



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iWave's i.MX6 Development Platform

The Development Platform incorporates Qseven compatible i.MX6x SOM which is based on Freescale's i.MX6 Series 1.2GHz multimedia focused processor and Generic Qseven compatible Development Board.

This platform can be used for quick prototyping of any high end applications in verticals like Automotive, Industrial & Medical. Being a nano ITX form factor with 120mmx120mm size, the board is highly packed with all necessary onboard connectors to validate complete i.MX6 CPU features.

WEC7 on i.MX6 SABRE SDP/SDB

iWave Systems, profoundly known for its genuine embedded solution offerings spanning from SOMs to fully integrated systems, announced the availability of Windows Embedded Compact 7 (WEC7) reference BSP for Freescale's i.MX6 SABRE SDP/SDB. The Freescale's i.MX6x SABRE SDP/SDB is powered with Freescale's i.MX6 Quad/Dual 1GHz, MMPF0100 Freescale PMIC.

The WEC7 BSP release supports: SATA II, Standard SD/SDIO, Gigabit Ethernet, LVDS, Touch Panel, HDMI port and also necessary hardware codecs supported by the CPU.

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